



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/823,485	04/12/2004	Jeong-Sic Jeon	4591-397	4940
20575	7590	10/18/2004	EXAMINER	
MARGER JOHNSON & MCCOLLOM PC 1030 SW MORRISON STREET PORTLAND, OR 97205			SMOOT, STEPHEN W	
			ART UNIT	PAPER NUMBER
			2813	

DATE MAILED: 10/18/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/823,485	Applicant(s) JEON ET AL.	
	Examiner Stephen W. Smoot	Art Unit 2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 April 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 09/948,425.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>4-12-04</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

This Office action is in response to application papers filed on 12 April 2004.

Specification

1. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: Semiconductor Device Having a Contact Window Including a Lower Region with a Wider Width to Provide a Lower Contact Resistance.

2. The disclosure is objected to because of the following informalities:

Update the first sentence of the specification to indicate that US Application Serial No. 10/341,766 is now US Pat. No. 6,764,955; and

On page 7, line 28, change "103" to --203-- because the impurity active region in Fig. 7 is designated as reference number 203.

Appropriate correction is required.

Claim Objections

3. Claim 10 is objected to because of the following informality:

In claim 10, line 3, change "a upper" to --an upper-- to correct grammar.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 2-3 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 2 recites the limitation "the second dielectric layer" in line 2; and

Claim 2 recites the limitation "the upper dielectric layer" in lines 2-3.

There is insufficient antecedent basis for these limitations in claim 2.

Claim 3 is rejected under 35 U.S.C. 112, second paragraph, because it depends on claim 2.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by IBM Technical Disclosure Bulletin, vol. 35, no. 2, pp. 51-53, July 1992.

Referring to Fig. 1(b) and the disclosure text, this IBM document discloses a contact window with the following structural features:

- A stack of layers comprising a nitride layer (i.e. a cap layer), an oxide layer (i.e. an upper dielectric layer), and a p-type polysilicon layer (i.e. a conductive layer) is deposited over a thermal oxide layer (i.e. a first dielectric layer) and two field oxides (i.e. a second dielectric layer);
- A window is formed by patterning the stack of layers, forming spacers on the sidewalls of the patterned stack, and etching the thermal oxide layer to form an opening that is wider than the opening through the oxide layer so that it undercuts the p-type polysilicon layer (i.e. two conductive patterns) as shown in Fig. 1(b); and

Art Unit: 2813

- A nitride spacer is implied because the thermal oxide layer is selectively etched using hydrofluoric acid and the spacer is used to protect the oxide layer during this etching step.

These are all of the limitations set forth in claims 1-11 of the applicant's invention.

8. Claims 1, 2, 10, 12 are rejected under 35 U.S.C. 102(b) as being anticipated by Sakaemori (JP 10-270555 A) using US 6,740,584 B2 as an English equivalent translation.

Referring to Fig. 18(h), column 14, line 18 to column 15, line 33, and column 16, line 34 to column 17, line 29, Sakaemori discloses a contact opening with the following features:

- A semiconductor wafer (1);
- A first dielectric layer (2);
- A second dielectric layer (3a);
- Wiring lines (6a) formed on the second dielectric layer (3a);
- An upper dielectric layer (3b) formed over the wiring lines (6a);
- An opening (4) formed through the upper dielectric layer (3b), the second dielectric layer (3a), and the first dielectric layer (2);
- The opening (4) is formed by anisotropic etching, which implies perpendicular sidewalls; and

Art Unit: 2813

- The opening (5) formed through the first dielectric layer (2) is further selectively isotropically etched so that it is wider than that of the second dielectric layer (3a) and the upper dielectric layer (3b).

These are all of the limitations set forth in claims 1, 2, 10, 12 of the applicant's invention.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Noda et al., Jun et al., Hsing et al., and Pong et al. teach structures with contact openings that feature enlarged bottom portions.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen W. Smoot whose telephone number is 571-272-1698. The examiner can normally be reached on M-F (8:00 am to 4:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead, Jr. can be reached on 571-272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2813

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SWS

Stephen W. Smoot
Patent Examiner
Art Unit 2813